C. Remarks

The claims are 1, 3, and 11 with claim 1 being independent. Reconsideration of these claims is expressly requested.

Claims 1 and 3 stand rejected under 35 U.S.C. § 103(a) as being allegedly obvious from JP 2001-343874 (Miura) in view of U.S. Patent No. 3,024,209 (Ferrigno); U.S. Patent No. 3,387,071 (Cahill); and U.S. Patent No. 2,926,389 (Garlington). The grounds of rejection are respectfully traversed.

Prior to addressing the merits of rejection, Applicants would like to discuss some of the features and advantages of the presently claimed invention. That invention, in pertinent part, is related to a process for producing a cleaning blade. This process comprising the following steps:

(1) drying a blade formed of a urethane resin so that the urethane resin has a water content of 1% by weight or less;

(2) after the drying, impregnating an isocyanate compound into the blade at least at a contact portion thereof, which said contact portion is to come into contact with a toner holding member, where the isocyanate compound is at a temperature at which it is in a liquid state;

(3) after the impregnation, blowing warm air or hot air on the blade surface to remove the isocyanate compound remaining on the blade surface, the warm air or hot air having a temperature not lower than the melting point of the isocyanate compound;

(4) further removing with a solvent the isocyanate compound remaining on the blade surface; and

(5) allowing the urethane resin that forms the blade to react with the isocyanate compound with which the blade stands impregnated, to form a cured layer below a surface of the blade that was contacted with the isocyanate compound,

The cured layer is formed chiefly of allophanate linkages. Also, the isocyanate compound is 4,4'-diphenylmethanediisocyanate.

Performing the process as presently claimed using the above-mentioned steps (1)-(5) enables formation of a cleaning blade with a more even surface surface, which prevent the "slip-through" (leakage) of toner.

Miura is related to a cleaning blade. As acknowledged in the Office Action, this reference does not disclose a process of forming such blade in which a blade is dried as recited in step (1), warm or hot air is blown as recited in step (3), and isocyanate compound remaining on the blade surface is removed with a solvent, as recited in step (4). The Office Action, however, alleges that these steps are taught, respectively, by Ferrigno, Cahill, and Garlington and that it would have been obvious to incorporate such steps into the disclosure of Miura to provide the presently claimed method. Applicants respectfully disagree.

Ferrigno is directed to polyurethane foam that contains inorganic pigment coated with polymeric material as a filler to reduce the cost of the foam. This reference

teaches adding a substantially dry pigment to a polyurethane prepolymer. Specifically, Ferrigno discloses that the pigment should have less than about 1% free moisture, because water carried by the pigment can react with isocyanate groups in the system. The prepolymer is then exposed to water to carry out the foaming process.

Ferrigno, however, does not disclose or suggest that a blade formed of a urethane resin should be dried to a moisture content as claimed. Ferrigno does not disclose or suggest that a reaction it is trying to prevent is undesirable in the context of the presently claimed invention. Furthermore, the moisture content per se as disclosed in Ferrigno is with respect to the pigment (filler), which does not include urethane resin; that is, Ferrigno does not provide moisture concentration with respect to the blade formed of a urethane resin. At most, Ferrigno teaches that moisture in the added pigment can prevent desired foam formation.

Cahill is directed to the preparation of polyurethane fibers. This reference, however, does not disclose or suggest blowing warm air or hot air to remove the isocyanate compound remaining on the blade surface before further removing the remaining isocyanate compound with a solvent and allowing the reaction of the urethane resin that forms the blade to react with the impregnated isocyanate compound to take place.

Cahill teaches producing spandex fibers by extruding a liquid polyurethane prepolymer, which is formed by reacting an excess of polyisocyanate with a polyol, into a cool bath comprising a polyamine and an organic solvent (col. 1, lines 69-71; col. 2, lines

65-67). The process in this reference is said to require a much lower concentration of amines in the solvent than the prior art (col. 1, line 71 – col. 2, line 3). Cahill teaches that in its process, either primary or secondary aliphatic or heterocyclic amines can be used as chain extenders (col. 2, lines 16-19).

In particular, Cahill describes the following process in reference to the figure:

> [A] quantity of liquid prepolymer mixture 2 was placed in a supply tank 4 connected to a pump 6 which, in turn, fed the spinnerette 8 immersed in the reaction bath 12 consisting of the polyamine in an organic solvent therefor contained in tank 14. The pump setting was such that a 100 gauge thread was produced at 200 feet per minute take-up speed. The extruded liquid was converted almost immediately to a thread 16. The thread then passed over roll 18 and into oven 20 for solvent and excess extender removal, as well as advancement of the cure. (Col. 4, lines 55-65).

That is, Cahill teaches reacting a liquid polyurethane prepolymer with an amine extender in the solvent and then removing the remaining solvent and extender in an oven. Neither of the compounds that are said to be removed in an oven is an isocyanate compound.

Furthermore, Cahill does not teach removing the solvent and the extender before the extender was allowed to react. For instance, the above-mentioned excerpt from Cahill explicitly states that the oven into which the extruded thread is placed also advances the curing process. At least partial curing is also mentioned by Cahill in Example 6.

Cahill, therefore, does not disclose or suggest removing excess compound prior to reaction taking place. Thus, Applicants respectfully submit that Cahill does not disclose or suggest blowing warm air or hot air to remove the isocyanate compound before the impregnated isocyanate is allowed to react with the urethane blade, much less before further removing the isocyanate compound with a solvent.

Garlington is directed to the use of surface modification to prevent formation of undesirable skin on polyurethane foam. This reference, however, does not disclose or suggest using a solvent to further remove the isocyanate compound in the context of blade formation.

Garlington teaches using a solvent to modify the yet uncured foamed polyurethane by increasing the pore size near its surface (see Fig. 2). That is, this reference teaches using a solvent to make a foamed material more porous near the surface to prevent formation of an undesirable hard skin layer when the foam cures. This is not what is performed in blade formation either in Miura or in the claimed invention. In fact, even in general, the solvent in Garlington is not used to remove one material from the surface of another material. This solvent is used to increase the porosity of uncured foam.

Moreover, as mentioned above by Applicants, carrying out the presently claimed steps as recited provides a blade with improved properties. This is conclusively demonstrated by the data in the specification and rebuts any presumption that modification of Miura would have been obvious.

In particular, the data in Tables 1 and 2 show that when the process is carried out without steps (1), (3), and (4) as claimed, which steps are not disclosed in Miura, the surface roughness of the cleaning blade is increased, which leads to undesirable slip-through of the toner. These unexpectedly superior results demonstrate that it would not have been obvious to modify the disclosure in Miura as alleged in the Office Action to render the presently claimed invention unpatentable.

Accordingly, Applicants again respectfully submit that whether considered separately or in any combination, the documents of record fail to disclose or suggest the presently claimed elements.

Wherefore, withdrawal of the outstanding rejection and passage of the application to issue are respectfully requested.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

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